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BERRY TEST SETS

OPERATORS MANUAL

D-CATS

DUAL CHANNEL ACCESS TEST SET

CSE Technologies, 100 W. Central, New London, MN. 56273

OPERATING MANUAL

DUAL CHANNEL ACCESS TEST SET

D-CATS

ISSUE 4

Preliminary

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Issue 3 - Date unknown.
Reason unknown.

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CSE Technologies first release with improved front panel and operating procedures.

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I GENERAL INFORMATION

1.1 Introduction

This manual describes the features, physical appearance, operation and maintenance for the 8401 Dual Channel Access Test Set.

1.2 Receiving Inspection

Upon receiving the equipment, check the carton and the instrument for signs of damage. If damage is found, file a claim with the transporting company. Keep the carton and packaging to support any claim for damage.

1.3 Product Description

The 8401 Dual Channel Access Test Set (D-CATS) is a multi-purpose, rack mounted test system which is used during installation and maintenance procedures on DS-1 (1.544 MHz) transmission lines. The D-CATS is intended for use at a DSX-1 bay by maintenance personnel, technical support groups, engineers and local craftpersons.

The D-CATS provides dual DS-1 transceivers compatible with Super-Framed DS-1 signals utilizing either D1D, D2, or D3/D4 channel assignment formats. This permits full duplex, in-service testing at the DS-0 level for the specified channel. Voice Frequency (VF) data that may be present on the channel under test can be monitored through an integrated speaker.

Performance monitoring functions are provided by the D-CATS through the use of front panel event indicators and accumulated errors display.

In addition to the normal drop and insert features, the D-CATS provides the following installation test functions:

Terminal mode operation (Simulates a channel bank)
Loop mode operation (Remote Loopback testing)
Transmit all ones (blue signal, keep alive)

II OPERATING INSTRUCTIONS

2.1 Front Panel Controls/Indicators

Figure 2-1 shows the front panel layout for the D-CATS. The following section describes the functionality of each switch and LED located on the front panel.

Each switch on the front panel has at least one corresponding LED which is used to indicate the switch status. When the LED is lit, the test mode associated with that switch is active.

@1 VOLUME - This knob controls the volume for the internal speaker. The signal present at the VF OUT jack is the signal monitored through the audio circuit. There is no Automatic Gain Control (AGC) on the audio circuit.

@2 WEST RECEIVE SUPV A & B - These two LED's show the current receive supervision status present on the "WEST DS-1 IN" jack.

@3 WEST RECEIVE STAT - These LED's indicate the current status of the signal present on the "WEST DS-1 IN" jack. The following describes each LED:

BPV - When this LED is lit, a Bi-Polar Violation has been detected.

LOS - This LED indicates a Loss of Signal at the DS-1 IN jack. A LOS is indicated when 255 consecutive zero's are received.

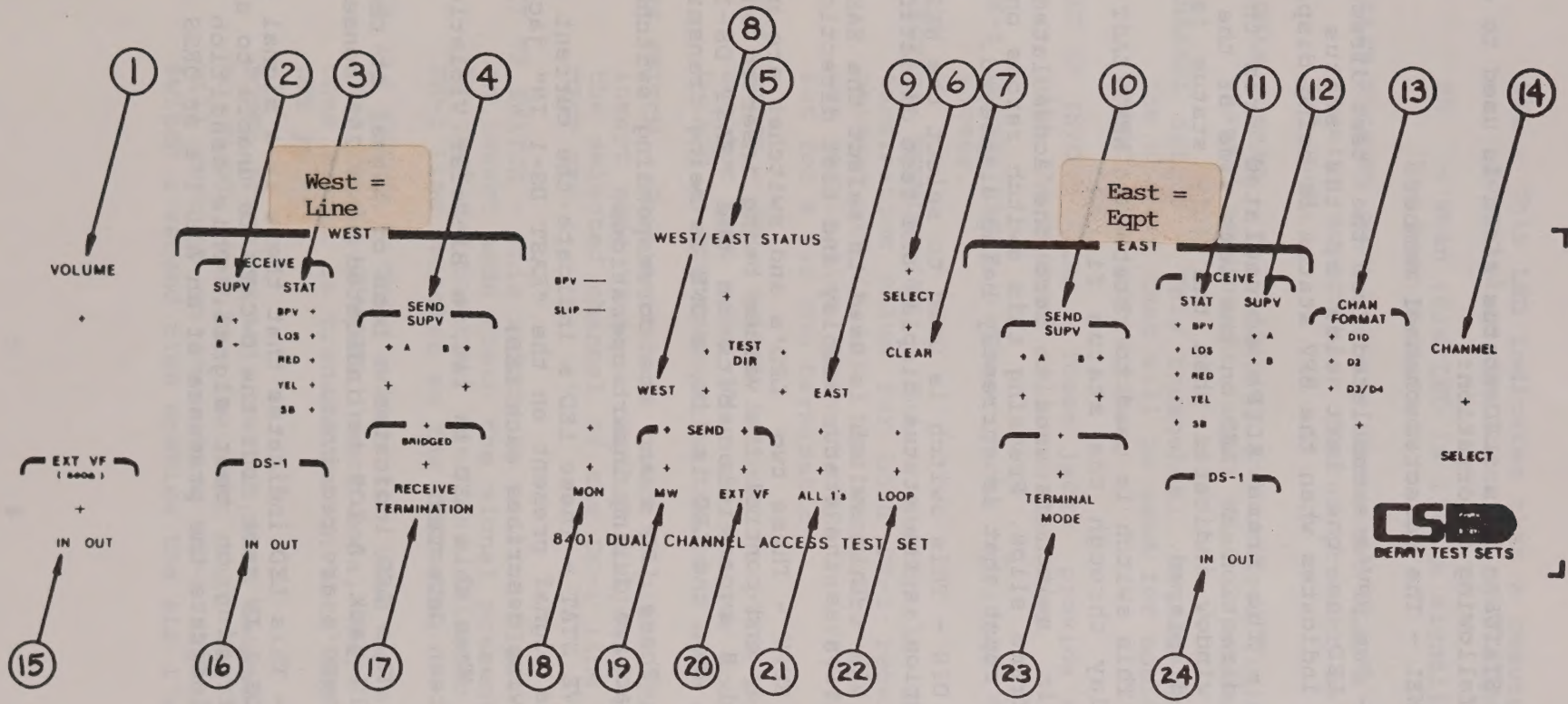
RED - This LED indicates that there is a signal at the DS-1 IN jack, but the D-CATS is unable to acquire framing on that signal. This condition could indicate the presence of an ALL 1's or QRSS signal.

YEL - This LED indicates that a remote alarm has been detected on the incoming DS-1 signal.

SB - When this LED is lit, a signaling framing error has been detected.

@4 WEST SEND SUPV - These two LED's and switches are used to display and control the values being inserted onto the A and B supervision bits on the "WEST DS-1 OUT" jack. When the LED is lit, a ONE is being transmitted.

NOTE: These LED's and the corresponding switches are only active during insert operations.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West = Line
East = Eqpt
WEST
EAST
VOLUME
RECEIVE
SUPV
STAT
BPV
LOS
RED
YEL
SB
SEND SUPV
BRIDGED
RECEIVE TERMINATION
EXT VF
DS-1
IN OUT
BPV
SLIP
MON
WEST/EAST STATUS
TEST DIR
WEST
SEND
EAST
MW
EXT VF
ALL 1's
LOOP
SELECT
CLEAR
TERMINAL MODE
CHAN FORMAT
D10
D2
D3/D4
CHANNEL
8401 DUAL CHANNEL ACCESS TEST SET
CSD
DEMAY TEST SETS

FIGURE 2-1

@5 WEST/EAST STATUS - This LED status field is used to display the following information:

CHANNEL - The selected channel number.

BPV - The BPV's accumulated from the test direction. A LED on the left side of the status window indicates when the BPV status is being displayed.

SLIP - The frame SLIPs accumulated from the test direction. A LED on the left side of the status window indicates when the SLIP status is being displayed.

@6 SELECT - This switch is used to rotate the WEST/EAST STATUS display through the status fields.

@7 CLEAR - This switch is used to zero the accumulated BPV's and frame slips. Pressing this switch zeroes only the error count that is currently being displayed.

@8 WEST TEST DIR - This switch is used to select the WEST test direction as the status display and test direction.

@9 EAST TEST DIR - This switch is used to select the EAST test direction as the status display and test direction.

@10 EAST SEND SUPV - These two LED's and switches are used to display and control the values being inserted onto the A and B supervision bits on the "EAST DS-1 OUT" jack. When the LED is lit, a ONE is being transmitted.

NOTE: These LED's and the corresponding switches are only active during insert operations.

@11 EAST RECEIVE STAT - These LED's indicate the current status of the signal present on the "EAST DS-1 IN" jack. The following describes each LED:

BPV - When this LED is lit, a Bi-Polar Violation has been detected.

LOS - This LED indicates a Loss of Signal at the DS-1 IN jack. A LOS is indicated when 255 consecutive zero's are received.

RED - This LED indicates that there is a signal at the DS-1 IN jack, but the D-CATS is unable to acquire framing on that signal. This condition could indicate the presence of an ALL 1's or QRSS signal.

YEL - This LED indicates that a remote alarm has been detected on the incoming DS-1 signal.

SB - When this LED is lit, a signaling framing error has been detected.

@12 EAST RECEIVE SUPV A & B - These two LED's show the current receive supervision status present on the "EAST DS-1 IN" jack.

@13 CHAN FORMAT - This display and control field identifies the channel assignment format that is currently in use.

@14 CHANNEL SELECT - This thumbwheel switch is used to select the channel that will be used for monitor and drop and insert test activities.

@15 EXT VF IN/OUT JACKS - These jacks provide 4 wire VF access with the channel selected for test.

@16 DS-1 IN/OUT JACKS - These jacks provide "WEST" DS-1 test access.

@17 RECEIVE TERMINATION - This switch is used to set the termination value for both DS-1 receivers. When the bridged LED is lit, the receivers are set for a 1000 ohm termination. When the LED is off, the receivers are set for a 100 ohm termination.

@18 MON SWITCH - This switch is used to place the D-CATS in the monitor test mode. When the monitor mode is active, the D-CATS is transparent to the DS-1 line under test.

@19 MW SWITCH - This switch is used to place the D-CATS into an insert mode where a digital milliwat is inserted into the selected channel of the DS-1 line selected as the TEST DIR.

@20 EXT VF SWITCH - This switch is used to place the D-CATS into an insert mode where the signal present at the EXT VF IN jack is inserted onto the selected channel of the DS-1 line selected as the TEST DIR.

@21 ALL 1's SWITCH - This switch is used to place the D-CATS into an ALL CHANNEL insert mode, where an unframed all ones signal is transmitted on both WEST and EAST DS-1 OUT jacks.

NOTE: Pressing this switch once causes the active LED to flash, warning the user that the insert activity will corrupt an in-service DS-1 signal. Pressing the switch a second time enables the ALL 1's insert mode.

@22 **LOOP SWITCH - This switch is used to place the D-CATS into a remote loopback test mode. When this switch is operated the receive signal from the TEST DIR is looped to the transmitter in the non test direction. The transmitter for the TEST DIR transmits an unframed all ones signal.**

NOTE: Pressing this switch once causes the active LED to flash, warning the user that the insert activity will corrupt an in-service DS-1 signal. Pressing the switch a second time enables the loopback mode.

@23 TERMINAL MODE - This switch is used to select a special mode of operation where the D-CATS is emulating a channel bank from the "EAST DS-1 OUT" jack. (A signal present on the "EAST DS-1 IN" jack will be overriden by the internally generated DS-1 signal).

NOTE: Pressing this switch once causes the active LED to flash, warning the user that the insert activity will corrupt an in-serive DS-1 signal. Pressing the switch a second time enables the terminal mode.

@24 DS-1 IN/OUT JACKS - These jacks provide "EAST" DS-1 test access.

2.2 Test Operation

The following sections provide a description of how the D-CATS is used during maintainence and installation procedures involving a DS-1 transmission line. This manual assumes that the testing will be performed in a central office, at a DSX-1 bay.

2.2.1 General Test Information

When power is first applied to the D-CATS, a power-on self test is automatically executed and, upon successful completion, the test set is configured for monitor mode test operations.

The default configuration, after the self test is as follows:

CHANNEL FORMAT = D3/D4
RECEIVE TERMINTAION = 100 ohm
TEST DIRECTION = EAST DIRECTION
TEST MODE = MONITOR

Prior to connecting a valid DS-1 signal to the D-CATS, the receive status for both sides should indicate a LOS. This is the only LED in the receive status field that should be lit.

The RECEIVE STATUS LED's identify the frame status of an incoming DS-1 signal through the use of the LOS, RED, and YEL status LED's.

The receive supervision LED's, both WEST and EAST, display valid supervision status only when the D-CATS is properly framed on a DS-1 signal.

The send supervision LED's are active only during a drop and insert activity.

The WEST/EAST status display, at power on, should display the channel number that is currently set with the channel select thumbwheel.

Pressing the SELECT switch causes the BPV LED in the upper left hand corner of the WEST/EAST STATUS window to be lit, and the number of accumulated BPV's to be displayed. The accumulated BPV's being displayed correspond to the TEST DIR that has been selected. The accumulated count of BPV's can be zeroed by pressing the CLEAR switch.

Pressing the SELECT switch again, causes the SLIP LED in the lower left hand corner of the WEST/EAST STATUS window to be lit, and the number of accumulated frame slips to be displayed. The accumulated frame SLIPS being displayed correspond to the TEST DIR that has been selected. The accumulated count of frame SLIPS can be zeroed by pressing the CLEAR switch.

Pressing the SELECT switch once again causes the selected channel to be displayed.

Test activities that are performed with the D-CATS will fall into one of two categories:

1 - maintenance procedures, or
2 - installation/turn-up procedures.

The remainder of this manual, for organizational purposes, will discuss each test procedure seperately.

2.2.2 Maintenance Test Procedures

Maintenance test procedures are tests which are performed on DS-1 signals that are currently in-service, and carrying either voice or data traffic. Caution should be exercised whenever access is made to an in-service DS-1 line to prevent inadvertently corrupting the in-service signal.

The D-CATS incorporates an important safeguard against the accidental corruption of an in-service signal. When the D-CATS is in the insert mode, if the channel is changed, the insert mode is automatically canceled and switched back to the monitor mode.

During maintenance test procedures there are again two modes of operation:

1 - Monitor Mode, and
2 - Drop and Insert mode.

2.2.2.1 Monitor Mode Operation

The monitor mode operation with the D-CATS allows a user to examine the frame status of the DS-1 signal, detect and accumulate errors and, on a channel by channel basis, monitor the supervision status.

Prior to connecting the DS-1 test signal to the WEST or EAST DS-1 IN jack, verify that the D-CATS is in the monitor mode, and that the RECEIVE TERMINATION is set for either BRIDGED (1000 ohm), or terminated (100 ohm) access. The receive termination should be determined by the access point of the DS-1 test signal. If the access point is directly onto the DS-1 signal, the bridged mode should be used. If the access point is via a resistive monitor jack, the terminated mode is required.

Connect the DS-1 test signals to the DS-1 IN jacks as shown in figure 2-2. Set the TEST DIR switches to coincide with the desired test direction. The RECEIVE STAT LED's will indicate the status of the incoming DS-1 test signals.

The data that is present on the test direction channel specified with the CHANNEL SELECT thumbwheel, can be audibly monitored by adjusting the volume of the internal speaker.

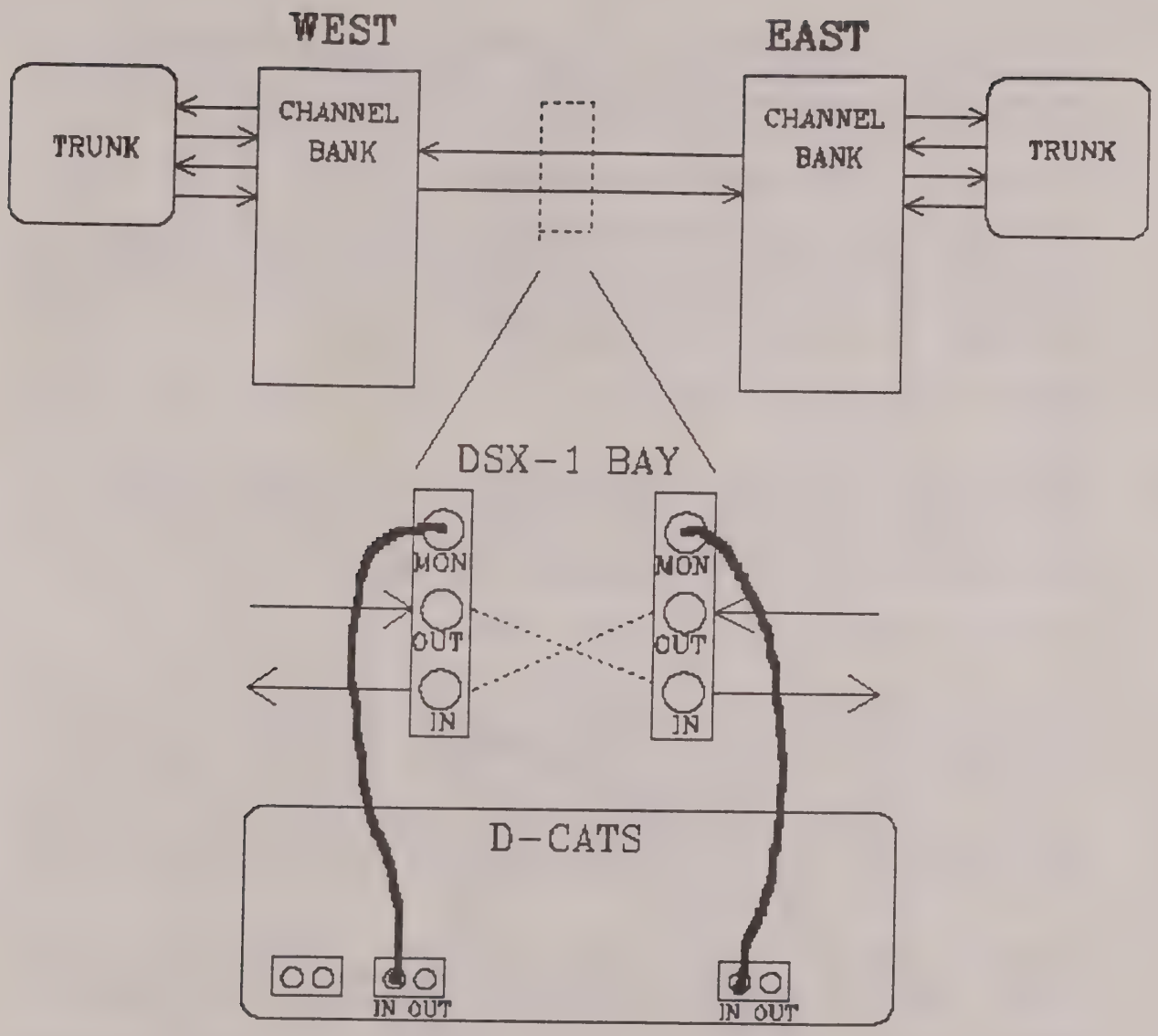


FIGURE 2-2

MONITOR MODE OPERATION

The receive supervision of the channel being monitored can be determined through the RECEIVE SUPV LED's. The receive supervision indicates the hook status of the trunk connected to the selected channel of the transmitting channel bank.

2.2.2.2 Drop and Insert Mode Operation

Once the D-CATS has acquired framing on the DS-1 test signal, a drop and insert test may be performed. This mode of operation allows a user to override the data and supervision being transmitted in the specified channel with either a digital milliwat, or a signal from the EXT VF IN jack.

Connect the DS-1 OUT jacks from the D-CATS to the DSX-1 bay as shown in figure 2-3.

NOTE: The order in which the patch cords are connected is important. First connect the patch cord to the DS-1 OUT jack of the D-CATS, and then connect the patch cord to the DSX-1 bay IN jack. Connecting the patch cords in this order minimizes the interruption of service on the DS-1 test signal.

2.2.2.2.1 Digital Milliwat Insert Mode

To insert a digital milliwat into the selected channel, simply press the MW switch on the front panel. The MW LED will light, and a digital milliwat is being transmitted in the channel number displayed in the WEST/EAST STATUS window. The send supervision status for the selected channel can be controlled by pressing either of the SEND SUPV switches. The SEND SUPV LED's indicate the current value being transmitted in the selected channel. When the LED is lit, a ONE is being transmitted. When the LED is blank a ZERO is being transmitted.

To cancel the digital milliwat insert mode, either press the MW switch again, or press the MON switch. The D-CATS will again become transparent to all 24 channels of the DS-1 test signals.

NOTE: Changing the channel while inserting a digital milliwat will cancel the insert mode.

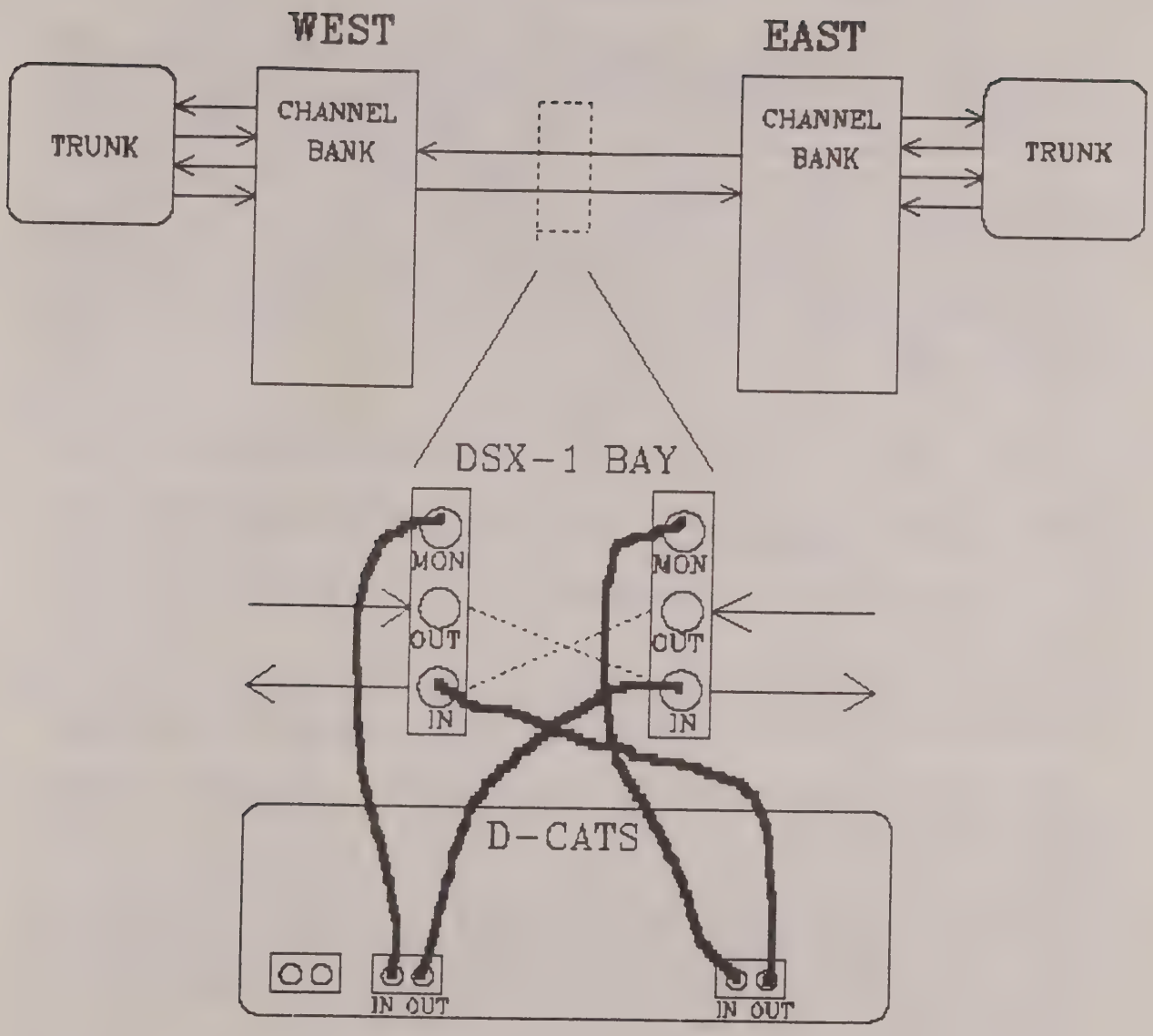


FIGURE 2-3

FULL DUPLEX DROP AND INSERT OPERATION

2.2.2.2.2 External VF Insert MOde

To insert an external VF signal into the selected channel, simply press the EXT VF switch on the front panel. The EXT VF LED will light, and the VF signal present on the EXT VF IN jack is being transmited in the channel number displayed in the WEST/EAST STATUS window. Pressing the SELECT switch now will display the current number of BPV's that have been detected, rather than the ALL display. This indicates that the D-CATS is NOT in an all channel insert mode. The send supervision status for the selected channel can be controlled by pressing either of the SEND SUPV switches. The SEND SUPV LED's indicate the current value being transmitted in the selected channel. When the LED is lit a ONE is being transmitted. When the LED is blank a ZERO is being transmitted.

To cancel the external VF insert mode, either press the EXT VF switch again, or press the MON switch. The D-CATS will again become transparent to all 24 channels of the DS-1 test signals.

NOTE: Changing the channel while inserting an external VF signal will cancel the insert mode.

2.2.3 Installation Test Procedures

Installation test procedures are tests which are performed on DS-1 signals that are currently out of service. These tests provide an installer with a known good signal that can be used to diagnose mismatched wire pairs, or faulty repeaters in the span.

Once the span line is determined operational, the D-CATS provides the installer with a framed DS-1 signal which can be used to turn-up a channel bank.

The D-CATS incorporates an important safeguard against the accidental corruption of an in-service DS-1 signal. When any one of the out-of-serice test modes are selected, pressing the switch the first time causes the corresponding LED to flash, indicating that the test mode is not yet operational, and any existing DS-1 signal will be overriden. Pressing the switch for a second time enables the test mode, and the LED will light steady. Pressing any switch other than the one with the flashing LED will prevent the test mode from becoming operational.

During installation test procedures there are several modes of operation, they are:

1 - ALL 1's mode,
2 - LOOP back mode, and
3 - TERMINAL mode.

The following sections describe each of these installation test modes.

2.2.3.1 ALL 1's Mode Operation

The ALL 1's mode of operation causes an unframed ALL 1's signal to be transmitted from both the WEST/EAST DS-1 OUT jacks. Any signal that may be present on the DS-1 IN jacks will be overriden with the unframed ALL 1's.

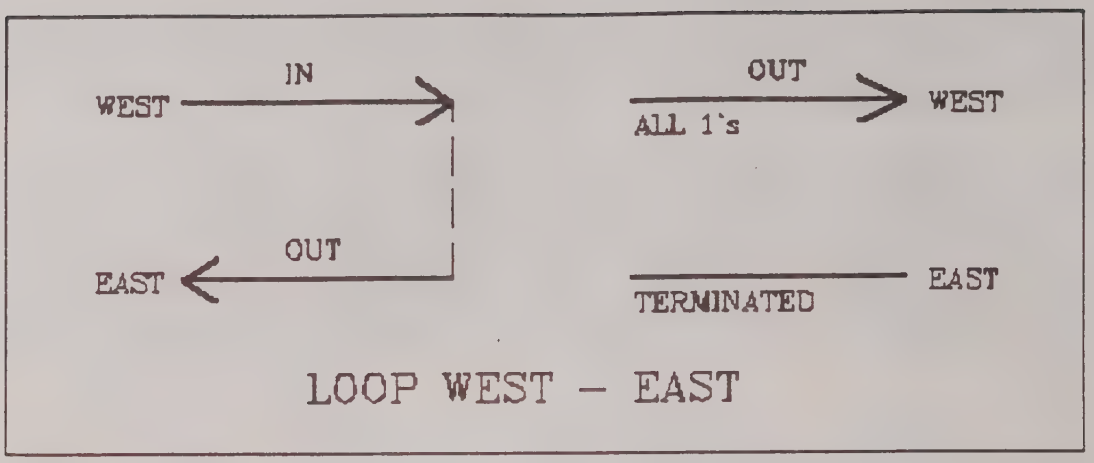
Prior to starting the ALL 1's insert test mode, connect the monitor jacks of the DSX-1 bay to the DS1 IN jacks of the D-CATS. Verify that there is not a framed DS-1 signal present on either the WEST or EAST receivers. Connect the DS-1 OUT jacks to the DSX-1 bay as shown in figure 2-3. Press the ALL 1's switch once, which causes the ALL 1's LED to flash. Press the ALL 1's switch again to enable the ALL 1's test mode. The ALL 1's test mode can only be canceled by pressing the ALL 1's switch for the third time.

2.2.3.2 LOOP Mode Operation

The LOOP mode of operation causes a loopback test to occur in the direction specified with the TEST DIR switches. The non-test direction will have an unframed ALL 1's transmitted on the DS-1 OUT jack. Any signal that may be present on the DS-1 IN jack of the non-test direction will be overriden with the unframed ALL 1's.

Figure 2-4 shows how the TEST DIR input and output signals are switched during LOOP back testing. The TEST DIR can not be changed once the LOOP test mode is active.

Prior to starting the LOOP mode of operation, connect the monitor jacks of the DSX-1 bay to the DS-1 IN jacks of the D-CATS. Verify that there is not a framed DS-1 signal present on either the WEST or EAST receivers. Connect the DS1-OUT jacks to the DSX-1 bay as shown in figure 2-3. Press the LOOP switch once, which causes the LOOP LED to flash. Press the LOOP switch again to enable the LOOP back test mode. The LOOP back test mode can only be canceled by pressing the LOOP switch for the third time.



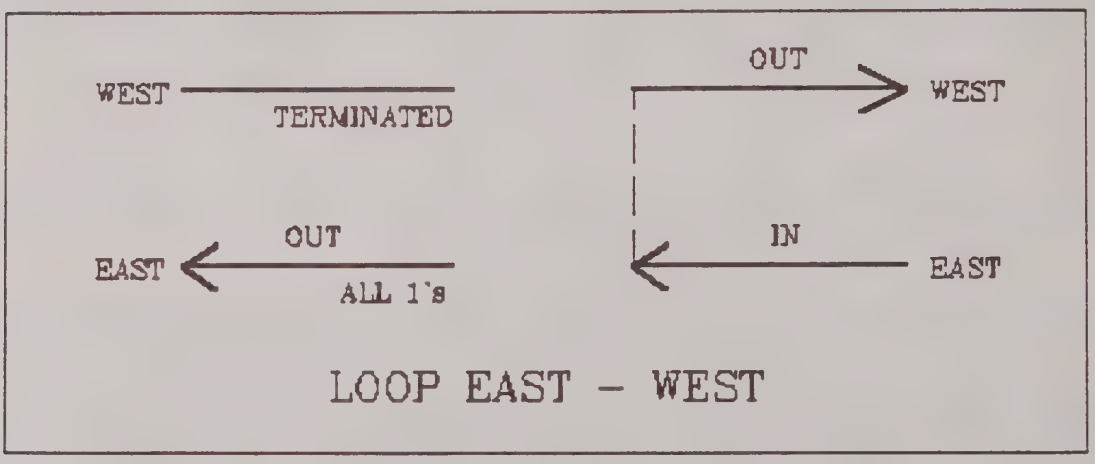


FIGURE 2-4

LOOP MODE OPERATION

2.2.3.3 Terminal Mode Operation

The TERMINAL mode of operation provides an installer with a framed DS-1 signal, derived from an internal clock, that simulates the operation of a channel bank.

Prior to starting the TERMINAL mode of operation, connect the monitor jack of the DSX-1 bay to the WEST DS-1 IN jack of the D-CATS. Verify that there is not a framed DS-1 singal present on the WEST receiver. Connect the EAST DS-1 OUT jack to the DSX-1 IN jack as shown in figure 2-5. Press the TERMINAL MODE switch once, which causes the TERMINAL MODE LED to flach. Press the TERMINAL MODE switch again to enable the TERMINAL MODE test. The TERMINAL MODE test can only be canceled by pressing the TERMINAL MODE switch for the third time.

When the TERMINAL MODE test is activated, the D-CATS automatically defaults the TEST DIR to the WEST side. Once the TERMINAL MODE is active, a digital milliwat, or an EXT VF signal can be inserted onto the channel specified with the channel select thumbwheel.

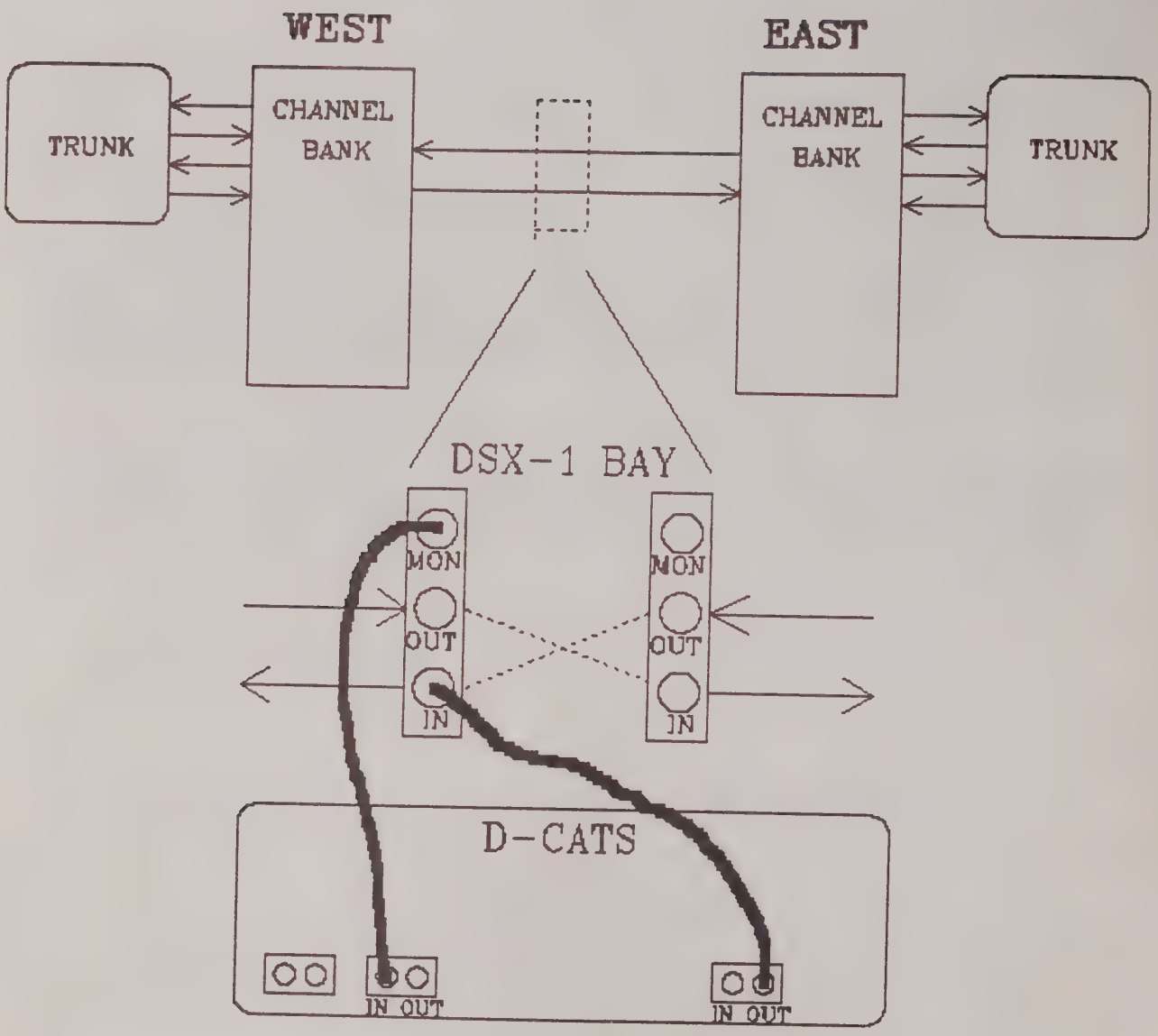


FIGURE 2-5

TERMINAL MODE OPERATION

III MAINTENANCE

3.1 Field Calibration

Field calibration for the D-CATS is not recommended. For technical assistance, contact the Customer Service Department at CSE Technologies.

3.2 Field Repair

Field repair involving replacement of components within a module or plug-in boards is not recommended. For technical assistance, contact the Customer Service Department at CSE Technologies.

3.3 Customer Service

CSE Technologies offers free phone consultation (no collect calls) concerning the operation or troubleshooting of all test equipment. Call the Customer Service Department at:

Outside Minnesota: (800) 428-9267
Inside Minnesota: (612) 354-2081

If, for any reason, a CSE test set fails to perform as expected, a Material Return Authorization (MRA) number will be issued from the Customer Service Department. All returned equipment must have an MRA.

Equipment in or out of warranty shipped air freight will be repaired within 4 working days. Equipment received by surface freight will be repaired within 10 working days.

3.4 Warranty Information

Complete warranty information is contained in the purchase order agreement under Terms and Conditions of Sale. Summarized briefly, the CSE warranty extends for a period of one year to the original purchaser of a CSE instrument.

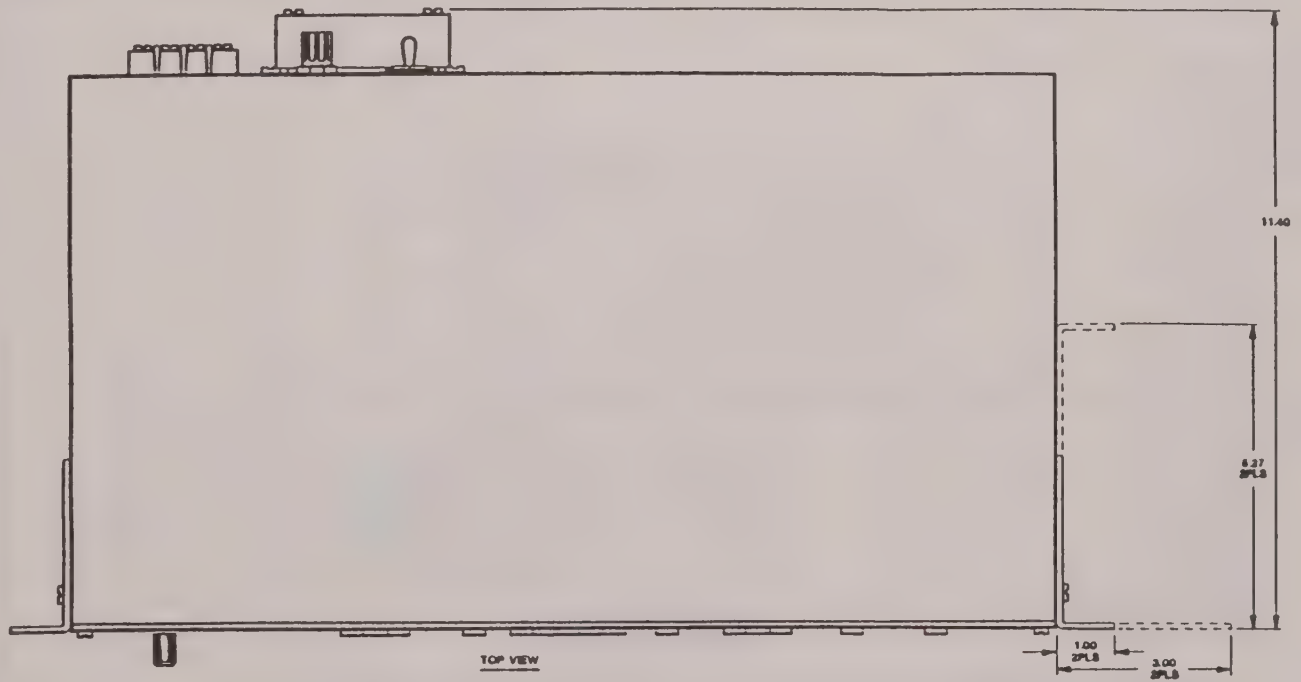
Note: Products which have been damaged by customer misuse, or have been repaired by other than factory technicians will not be covered by this warranty. CSE Technologies is not liable for consequential damage. No other warranty is expressd or implied.

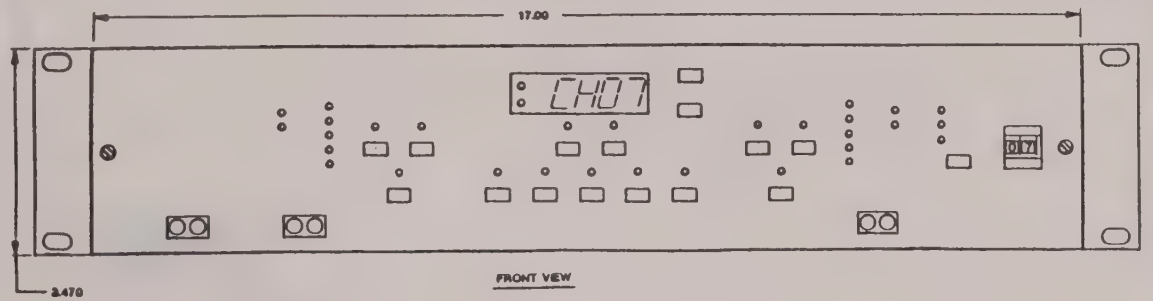
APPENDIX A

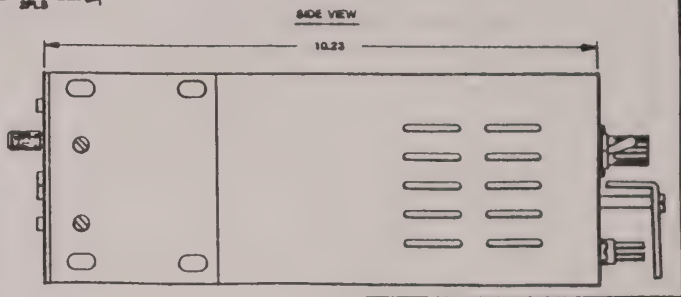
INSTALLATION

Figure A-1 identifies the physical characteristics of the 8401 Dual Channel Access Test Set (D-CATS). This figure can be used to allocate rack space for the D-CATS in either a 19 inch or a 23 inch rack.

Figure A-2 identifies the electrical connections that are located on the rear panel.



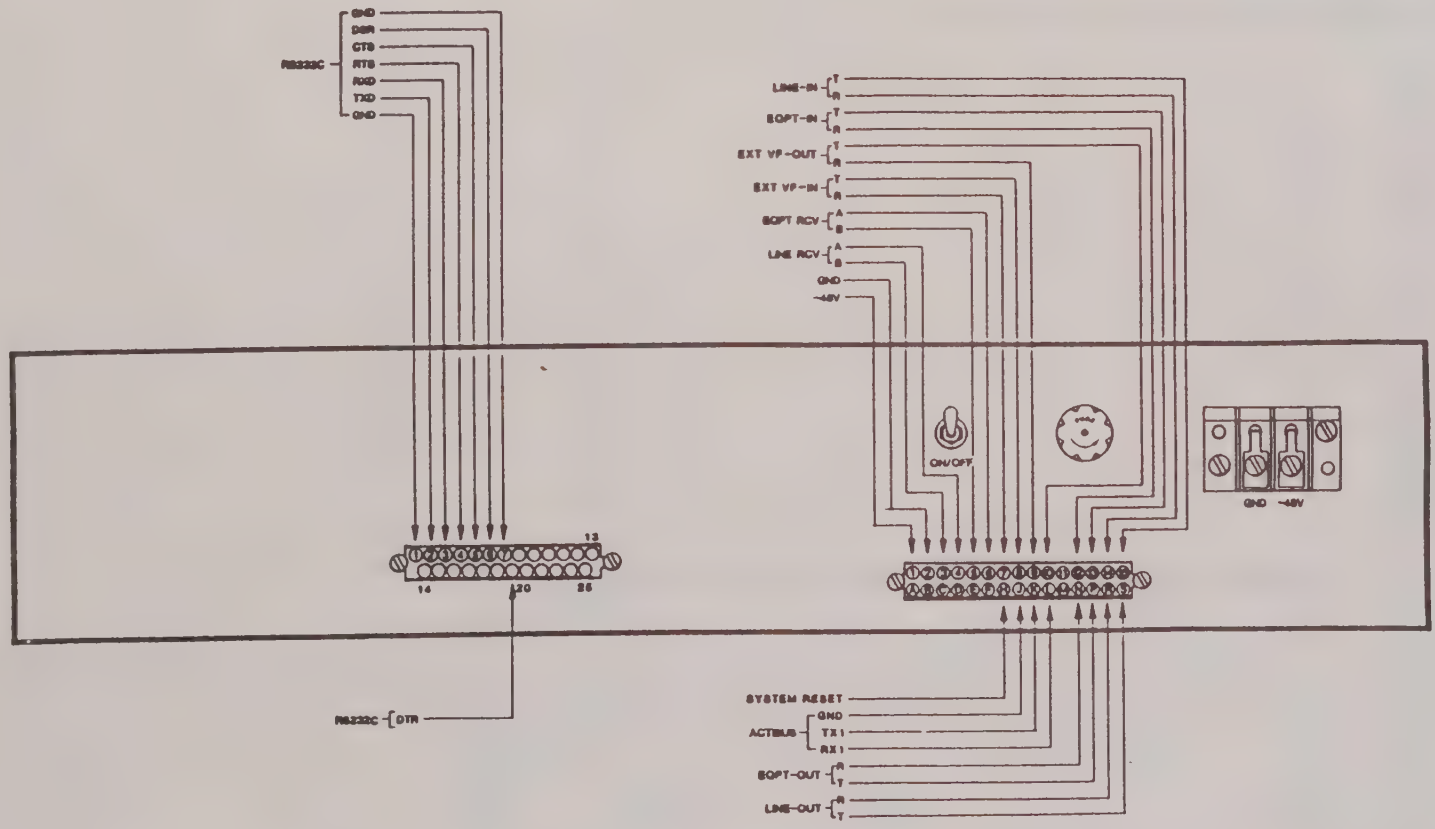




CSD TECHNOLOGIES

INSTALLATION DRAWING
APPENDIX A-1

B



CSD TECHNOLOGIES

PART/DESCRIPTION
INSTALLATION DRAWING
APPENDIX A-2

B

APPENDIX B

FUNCTIONAL SPECIFICATIONS

Interface

TDM Hierarchy:	DS-1 (1.544 Mhz)
Carrier Protocol:	D1D, D2, D3/D4
DS-1 Input Impedance:	100 ohms, balanced, terminated, or 1000 ohms, balanced, bridged
Input Level:	~~3~~ 1.5 P TO P volts peak-to-base
DS-1 Output Impedance:	100 ohms nominal, balanced
Output Level:	3 volts peak-to-base

External VF Input/Output

Input Impedance:	600 ohms nominal, balanced
External VF level:	0 dBm nominal

DS-0 Signal Sources

Receive Channel:	Normalled through
External VF:	300 - 3200 Hz, 600 ohms (user supplied)
Internal Milliwat:	1000 Hz, 0 dBm0 at receive terminal

General Features

Power Requirements:	-48VDC, at 0.7A
Physical:	3.5" high, 17" wide, 10" deep Fits in two 19" or 23" rack spaces

APPENDIX C

GENERIC MML DICTIONARY

The terminal should be set to 1200 baud, with no parity, 8 data bits, and 1 stop bit.

All command lines must include a verb. Parameters must be preceded by a colon (:), with multiple parameters delimited with commas. Commands may be mixed upper and lower case ASCII characters. All command lines must be followed by a carriage return.

Befure using any of the following commands, the user must first log on. To log on, type LOGON and hit return. The display will show "BUSY" and the front panel will not function. To return to front panel operation, type LOGOUT and hit return.

MONITOR - This command is used to specify the channel and enter monitor mode.

```
MONITOR:CHANNEL=#nn
MONITOR:CH=#nn
MON:CHANNEL=#nn
MON:CH=#nn
```

nn represents a number between 1 and 24.

RECEIVE - This command indicates from which direction to monitor.

```
RECEIVE:FROM EQPT
RECEIVE:FROM LINE
RCV:FROM EQPT
RCV:FROM LINE
```

REPORT-PCM - Requests a report from the PCM module. The repeat parameter may be used. For example: REPORT-PCM:ALM,REPEAT=10 requests 10 alarm reports from the PCM unit. A parameter list must be included to specify the type of report, alarms, bipolar violations, channel, or framing errors. REPORT may be abbreviated RPT.

REPORT-PCM:ALM	Reports the status of the alarms.
REPORT-PCM:BPV	Reports the number of bipolar violations logged.
RPT-PCM:BPV	Alternate form.
REPORT-PCM:SLIP	Reports the number of frame slips logged.

RPT-PCM-SLIP	Alternate form.
REPORT-PCM:CH	Reports the channel number that is being monitored. Repeat parameter is not allowed.
REPORT-PCM:DIR	Reports the selected test direction.

CLR-CTR - Clears the count of bipolar violations or frame slips.

CLR-CTR:BPV	
CLR-CTR:SLIP	
CLR-CTR:SLIP,BPV	
CLR-CTR:BPV,FRM	
CLR-CTR:ALL	(clears all counters)

STATUS-PCM - Requests the PCM unit to perform a specified test. Available options are:

TST-PCM:ALL1	Send ALL 1's
TST-PCM:LOOP	Loop mode
TST-PCM:TERMINAL	Terminal mode
TST-PCM:RESTORE	Resets from ALL 1's, LOOP, Terminal modes, MW, or OSC.

SEND-PCM - Requests the PCM unit to send a specified signal.

SEND-PCM:MW	Selects digital milliwat.
SEND-PCM:MW,ALL	Selects digital milliwat on all channels.
SEND-PCM:OSC	Selects an external VF test signal
SEND-PCM:OSC,ALL	Selects an external VF test signal on all channels.

FMT - Selects the carrier format.

FMT:D3/4
FMT:D1D
FMT:D2

SET-bb CLR-bb - Controls send supervision. bb specifies the bit to set (1) or CLR (0). bb= AL for line side A bit, BL for line side B bit, AE for equipment side A bit, BE ofr equipment side B bit.

OPEN

WEST IN T R

WEST OUT T R

.8 .8

OPEN

EAST IN T R

EAST OUT T R

1.5 1.4

OSI IN - WEST IN OPEN

OSI OUT WEST IN

JACK P R = .8
S T = .8

JACK

OSI in EAST IN T R OPEN

" EAST OUT T R OPEN

OSI OUT T TO EAST IN T

1.5

R 1.5 R

BOB - JERROD

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